

Draft Workshop Recommendations / Compiled by A. Moore and R. Weber

Real-Time Products and Applications (J. Dow and Y. Bar-Sever)

1. A variety of applications including weather prediction, ionospheric weather monitoring, satellite and terrestrial navigation, earthquake and volcano monitoring, positioning of structures, surveying, timing and earth orientation would benefit from the availability of Real-Time (RT) GPS raw data products and from RT or Near Real-Time (NRT) products computed from them. In view of this trend towards real time, the relevant IGS elements should press ahead with the development of:
 - a. the infrastructure needed to transfer in real time raw GPS data from a sub-set of the stations of the global network to servers located at those IGS Analysis Centres interested in participating in this new activity;
 - b. the software needed to generate, quality check and disseminate RT and NRT orbit, clock and other products (Global Ionospheric Map (GIM), Total Zenith Delay (TZD), ...)
2. An appropriate project structure should be set up within the IGS to coordinate and execute this work (for example the Real-Time Working Group (RTWG)).
3. As an interim measure, the AC's and the AC Coordinator are encouraged to:
 - a. review the current latencies of the classical orbit and clock products (ultra-rapid, rapid, final) and assess whether it is appropriate to modify these in view of the increased availability of hourly stations and whether it is still necessary to maintain separate rapid and final products.
 - b. reduce as soon as feasible the latency of the ultra-rapid products from the current 12 hours to 3 hours.

Real-Time Data/Products Exchange (M. Caissy and R. Muellerschoen)

It is recommended that the IGS community guided by the RTWG move forward on two fronts with the goal of completing phase 1 of the RTWG's charter.

- 1) Involve the broadest membership as possible from within the IGS community.
- 2) Move forward on the development of a prototype for data and product exchange incorporating the design presented in the position paper with the following additional recommendations based on discussions at the workshop:

It is recommended that the RTWG investigate the impact of using Transmission Control Protocol (TCP) in place of User Datagram Protocol (UDP) in order to assess the value of using TCP in the post-prototype phase of IGS real-time processes.

It is recommended that the RTWG investigate the impact that the choice of UDP may have on our ability to traverse firewall implementations at institutes where the use of UDP is discouraged or denied.

It is recommended that due to the demonstrated interest from global data centres, they be involved on a voluntary basis, at the prototype stage, in a demonstration of the concept of distributed data centres.

Data Center Issues (C. Noll and L. Daniel)

DAT1: A Subset of Data Centres (DC)s should participate in RTWG's prototype efforts

DAT 2: Establish a DC Working Group

- to evaluate metadata storage and exchange as well as monitoring and bug tracking
- to create and maintain the
 - (a) topology of data flow up to Global Data Centres (GDC)
 - (b) DC requirements and guidelines

DAT 3: GDCs and Regional Data Centres (RDC)s should participate in GPS Seamless Archive Centre (GSAC) effort

DAT 4: Integrate GPS/Glonass data flow into IGS paths

Network Issues (A. Moore and M. Schmidt)

NET 1: Form an IGS industry panel with representation from manufacturers of equipment used in IGS

NET2: Implement associate regional networks and associate applications networkers

NET3: ACs and Pilot Project (PP) / Working Groups (WG)s should communicate to the Network Coordinator (NC) recommended equipment guidelines (e.g. radome types, non DM antennas,...) and recommended degree of enforcement

NET 4: Reference Frame Working Group (RFWG) should recommend conventions for reporting time series discontinuities

NET5: IGS should keep abreast of and prepare for GPS modernization; When equipment and signal availability schedule is clear, a phased adoption at IGS sites should be coordinated

NET6: Form a RINEX task force

Reference Frame (R. Ferland and Z. Altamimi)

REF FR 1

Test in detail the various proposed combination/constraining approaches (fixing- minimum constraints-combined) to align regional solutions to the ITRF. Use various regions and time spans. Agree on one proposition to be recommended for all regions.

Antenna Calibration: (M. Rothacher and G. Mader)

CALIB 1

Review and adopt the new IGS Phase Centre Variation (PCV)-format for receiver and satellite antenna phase centre corrections. (envisaged date for adoption Jan, 1st, 2003).

CALIB 2

Adopt absolute antenna PCV for receiver antennas and new satellite

antenna offsets and patterns after conducting a thorough test campaign (envisaged date for adoption Jan, 1st, 2003).

CALIB 3

Set up a so-called 'Antenna WG' to keep track of antenna issues in general and to organise the transition to absolute phase centre variations in particular.

CALIB 4

Avoid to the extent possible any change in the antenna setup at IGS permanent sites. Whenever possible the same antenna type should be installed in case of replacement due to malfunctioning of older hardware.

Ground-Based Ionospheric Estimation (J. Feltens and B. Wilson)

ION 1:

Start with the delivery of a combined IGS Ionosphere Product (asap / when?)

ION 2:

Combined IGS Total Electron Content (TEC) maps should be produced with an overlap of one day to decrease jumps at the day boundaries.

ION 3:

Global Ionospheric Associate Analysis Centres (IAAC)s TEC maps should cover all parts of the world.

ION 4:

Explore the use of ENVISAT and JASON satellites for validation of IGS Ionosphere Products.

ION 5:

In view of NRT Monitoring of the Ionosphere the distribution of ground stations as well as the data flow (latency) has to be improved.

IGS-LEO (H. Boomkamp)

IGS-LEO 1:

Explore in detail the impact of GPS-LEO data on the classical IGS products in combination solutions.

IGS-LEO 2:

Explore the latency requirements for tracking data availability as well as delivery of current IGS products to support LEO data processing (e.g. for atmosphere sounding).

IGS-Products (J. Ray and R. Weber)

PROD 1 (Time Scale)

Adopt a new time scale for IGS Final and Rapid Products to achieve continuity at day boundaries and allow for a direct link to UTC.
(envisaged date of adoption: July 1,2002)

PROD 2 (New SP3 format)

Review and adopt a new version of the SP3 format. To serve the user community keep both the old and the new format in parallel for a period of at least 1 year. (envisaged date of adoption: July 1,2002)

PROD 3: (GLONASS data processing)

Intensify the ability to process data from combined GPS/GLONASS tracking sites. ACs and AACs are encouraged to provide orbit and clock submissions in order to ensure a reliable combined IGS GLONASS orbit and clock product.

PROD 4: (IGU products)

In view of upcoming NRT- needs explore and implement a more frequent update of the IGU -Ultra Rapid Products. An update cycle of 3 hours (currently 12 hours) for IGU products is envisaged. Investigate the option of different update cycles for orbits (6 hours) and clocks (3 hours). In addition explore the possibility of decreasing the latency of IGU products from currently 3 hours to 2.5 hours as well as the submission of 5-minutes rinex-clock files.

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